

VIRGINIA WILDLIFE

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Commission Photo by Kesteloo

Bee swarm. . . . A strong colony of honey bees may have 60,000 or more workers.

VIRGINIA WILDLIFE

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A Monthly Magazine Dedicated to the Conservation, Restoration, and Wise Use of Virginia's Wildlife and Related Natural Resources, and to the Betterment of Hunting and Fishing in Virginia

COMMONWEALTH OF VIRGINIA



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Cover

The great blue heron is one of the most easily recognized birds along our bays, rivers, creeks and water courses. Large heron rookeries formerly were found on some of Virginia's coastal islands but man's disturbances have driven them to safer retreats.

National Audubon Society Photo by Allan D. Cruickshank

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Water . . . Life Blood of Our Land

NOT a living thing on this earth can survive without water. It is a major necessity secondary only to the air we breathe. All forms of life, as we know it today, from microscopic plants and animals to the giant sequoia and sulphur-bottomed whale, largest animal living or that ever lived, must have varying amounts of it to survive.

Ironically, water is our most abundant resource. Yet, usable unpolluted water is rapidly becoming a scarce commodity in places where it is needed most. It is a serious situation when usable water supplies become less dependable while the demand steadily rises in response to population growth. Pure water is no longer free over the nation's three-million square miles as it was to our pioneer forefathers. It is costly, a necessity, and out of the luxury class. But as long as increased water bills are used for adequate purifying plants and sewage disposal treatment systems that will clear our streams, lakes, and ocean fronts of filth and pollution, then it is the wisest investment we can make and money well spent. We are not talking now of the desert and semi-arid regions of the West, where water has always been a limiting factor, but of the eastern United States including Virginia, an area of usually abundant rainfall.

If we look even casually at the pages of history, we find that damaged watersheds, resulting erosion and silt-carrying waters have choked the very life from once great civilizations. Here in America the Cochise people who once inhabited the Arizona-New Mexico desert country, the Mesa Verde Indians of the great Southwest, and the Pima Indians of southern Arizona are examples of primitive communities and entire civilizations that were squeezed out of areas because of water relationships to living. If we look beyond our boundaries there are many, many other examples. Grim warnings of what has happened in the past because man didn't have the know-how or value water enough to take proper care of it.

Historian Arnold Toynbee suggests that there were 20 civilizations preceding ours which rose to prominence and influence in history, then fell from the heights. He attributed the rise and fall to wars, internal strife or decadence of the people. Today conservationists suspect that many of these civilizations failed because of a breakdown in their natural resource strength. Even today in the ruins of ancient cities of the Roman Empire there are remnants of elaborate aqueducts that carried water for hundreds of miles, marble baths and even flush toilets. It has been said that the fall of the Roman Empire in all probability was not caused by the defeat of armies but simply because the water played out.

Water on the earth is continually going through a cycle that hydrologists call the hydrological cycle. It is a complex operation and even today baffles the best minds in science. Simply, this is how the cycle works. The

sun, source of all energy, keeps the cycle functioning by evaporating moisture from the surface of the earth. Wind picks up this vapor and, when atmospheric conditions are right, clouds are formed. These clouds chill and raindrops result. Here the force of gravity takes over and the drops theoretically fall back to the earth. It really isn't this simple. Many other factors like where, when and what amounts of rainfall must be considered to present a true picture.

Climatologists suspect that clearing land for agriculture, building cities, roads, airports, etc., might have a bearing on less favorable rainfall conditions in the United States in the last half century. Most certainly, this has increased the number and severity of devastating floods common today in most sections of our country.

Here in Virginia and across the nation, dry years have made the people who live on the land more water conscious. Hunter Sheppe of the Soil Conservation Service office in Richmond, who has many jobs, one of which is keeping records and reports of S. C. S. activities, said yesterday that through December 31, 1956, S. C. S. agents have helped with the construction of 15,142 farm ponds in Virginia and that through the same date they had collaborated on the construction of 833,592 ponds throughout the United States and her possessions. These are impressive figures and indicate the value that farmers are putting on water.

Besides the hundreds of secondary and inter-related uses for water including fish habitat, man and animals must take water into their bodies to sustain life. Approximately seventy percent of the human body is water and it is estimated that it will eliminate an average of eleven pints of water a day while doing moderate work in a temperate climate. Sanitary engineers figure that in a highly industrial city, water consumption per capita may top 300 gallons a day. It will average 200 gallons even in small communities. This in itself is staggering water use when we consider our population right now is well above 150 million. United States Department of Agriculture experts calculate that a little pig needs twelve pounds of water daily for every 100 pounds body weight. Horses will drink 80 to 100 pounds of water a day. A lamb requires one and one-half gallons of water every 24 hours. It is beyond the limits of available data to attempt to estimate just how much water is consumed daily by our many different forms of wildlife; but, as an interesting comparison, Virginia's deer herd now is estimated to number about 200,000 deer. Surely a deer will need as much water as a lamb to survive and, if it does, Virginia's deer herd alone every day is drinking three hundred thousand gallons of water.

Yes . . . water is a precious resource. Use it wisely. Keep it clean. It is indeed the life blood of our land.

—W. C. K.



Commission Photos by Kesteloo
The red fox is one of Virginia's most controversial animals. However, if it were entirely removed from the American scene, something would be lacking in nature.

FREQUENTLY in this modern day and age, wild animals and their habits conflict with man and his high-g geared economy. Such is the case of the red fox, probably one of the most adaptable wild animals on the North American continent today.

His very presence in an area can cause a great diversity of opinion, and usually does. The description of the red fox given by Seagers, 1944, most nearly fits these opinions. "The red fox is the best loved and most hated, praised and berated, wisest, smelliest, daintiest, thinnest, sleekest, most flea bitten and most controversial creature to occupy the ardent attentions of the hound hunters and poultry owners in the nation." It depends upon which side of the fence you choose to sit. There are many fox hunters who chase him, but will not shoot him. Small game hunters by the thousands believe that there should be a bounty on him. And some orchard owners, plagued by mice, want a bounty on those who want a bounty.

Early History

There are many ideas circulating around the country as to the origin of the red fox and his present status and populations as we know them. Seton, 1929, stated that at one time the red fox was extremely rare or altogether absent from the southeastern United States. This fact has given rise to the theory, which is supported by considerable testimony by Beatty and Mulloy, 1940, that our red fox is not native but has been introduced from Europe specifically for the pleasure of the early fox hunter. We are confronted with indisputable evidence, however, that a species of red fox did exist in the northwest and central plains states and that this species is closely related to the European red fox.

Red Foxes— Facts and Fancies

By F. NELSON SWINK, JR.

Virginia Mammal Control Supervisor

Several writers have presented evidence which strongly suggests that Seton is correct in surmising that the red fox as we know it today is a cross between the English red fox, imported from England in the middle 18th century, and a species of red fox that existed in North America above the latitude 40 to 45 degrees. Scott, 1951, in a letter to the writer had this to say, "Even though fairly large numbers of European red foxes had been released during the early days (which I doubt), it seems likely that only a few years would have passed before the introduced species would lose its identity." The writer must agree with Dr. Scott when it is remembered that when back-crossing occurs the offspring become indistinguishable from the recurrent parent stock within five or six back-crosses. And in view of the probable relative numbers of red foxes at the time of introduction, if hybridization took place at all it would seem likely that most of the breeding was in the form of recurring back-crosses on our native red fox.

Further evidence has been recently presented from bone caves throughout the East, revealing a total absence of red fox remains in many caves which showed abundant gray fox remains as well as other common mammals. This evidence strongly supports the theory that red foxes, at least on the eastern seaboard, are doubtlessly a cross between our native red fox from the north central section and the European red fox, an introduction.

Populations

Any estimation as to the number of red foxes in Virginia today is purely a guess. There is no accurate method of estimating a fox population. The red fox population in most parts of Virginia is on the decrease, due largely to a severe outbreak of sarcoptic mange. Nearly

all of the counties located west of the Blue Ridge Mountains report this condition and many counties east of the mountains, particularly those located in the northern half of eastern Virginia. From trapping reports all over the state, gray foxes outnumber red foxes ten to one, even more in many places.

The number of foxes inhabiting an area at any one time of the year varies greatly. Large fox populations can live on a relatively small area. An example of this was observed by the writer in the early '50's at Blacksburg, Virginia, on the Virginia Polytechnic Institute college farms where the red fox population was seen to increase from two litters in the spring of 1950 to ten litters in the spring of 1951 and as many as nine litters in 1952. The first year 19 foxes were seen, most of them pups, and one den contained ten pups and two adults, suggesting a communal den; the other den had six pups. By the next spring approximately 40 foxes, or one fox per 57.5 acres was noted and in 1952 at least 35 foxes were noted, or one fox per 65.5 acres. These figures are all spring records and do not constitute an annual resident population by any means. Robeson, 1950, reported one fox per 107 acres in 1947-48 and one fox per 142 acres in 1948-49 in New York state on some areas. Scott, 1947, reports one fox per 535 acres and one fox per 134 acres on two areas in Iowa. Murie reported one fox to every 150-200 acres on one area in Michigan in 1936.

It is evident that the fox population can be extremely dense, yet little evidence of this density can be noted, except at certain times of the year, chiefly in the spring months when young foxes are frequently seen.

Reports from nearly all sections of the state indicate a general decline in the fox population over a few years ago. But the fox can take it and undoubtedly will increase in numbers within the next several years.

Some indication of the fox population can be gained by trapping an area intensively, as during a rabies-control program. In one county in Virginia during the winter of 1955-56, approximately 700 foxes were trapped.



Trapping reports collected from all over the state indicate that the gray fox (shown here) outnumbers the red fox ten to one. In some localities this ratio is even more pronounced.



The red fox measures 41 to 43 inches from the tip of his tail to the end of his nose and stands about 15 or 16 inches tall at the shoulders. Males will weigh about 9 to 11 pounds. Females are lighter.

Often the records established by rabies-control programs astonish residents of the counties, for many times the writer has heard people say, "I had no idea that there are that many foxes in this county." This information indicates the possibility of a large fox population living in an area and leaving little or no visible evidence of the size of that population.

Size

The red fox measures 41 to 43 inches from the tip of his tail to the end of his nose, his tail averages about 14-15 inches in length and he stands about 15 or 16 inches at the shoulder. Many people will guess his weight to be much more, but actually under that heavy coat is a streamlined bundle of muscles that will average only about 9 to 11 pounds for males and slightly less for females.

Breeding

Wild foxes are monogamous, probably mate for one season but in captivity they may be polygamous. However, in the wild, when the food-gathering role of the male for the female and young is considered, it is doubtful if wild foxes are polygamous to any extent. Male foxes tend to wander in the fall and early winter and it is reasonable to assume that they select a new mate each year.

The breeding season starts in January and may continue well into March. Schoonmaker, 1938, states that breeding starts in early February in New York, while Asdell, 1946, writes that most matings are in late January through February. Mr. Roy Harman of Harman Fur Farms, Christiansburg, Virginia, states that most matings were from the last week in January through the third week in February, but were noted as early as December 24 and as late as March 15. Information collected in Virginia on wild red-fox populations indicates that by late February breeding activities are well underway, perhaps nearly completed, and some data indicates that

the breeding starts as early as the first week in January.

The pups are born about 52 days after fertilization and number four to ten. In a study conducted at Blacksburg, 1950-52, by the writer, an average of 4.38 pups per litter, based on 13 litters of young was observed. Litters varied from one to seven pups per litter. It is generally conceded that five to seven pups is the average red-fox litter.

Range

In Virginia the red fox is found in nearly every county, the only exceptions being in the extreme southeast corner of the state. Many areas report relatively high populations of red foxes, but upon investigation many of these turn out to be gray foxes with considerable amounts of reddish tinge. It is astonishing the number of people who can't tell the difference between a gray and a red fox. The red fox is often seen in the daylight, for he does not use a den very often and likes to hunt and sleep out in the open, which is exactly opposite to the gray fox.

Food Habits

The red fox has a varied diet and will eat nearly anything. They feed upon small mammals, birds, fruits, vegetables and insects, chiefly. From the better studies it is calculated that cottontail rabbits comprise 30 to 40 percent of the diet, mice 40 to 50 percent, and the remaining 10 to 30 percent is made up of various and assorted berries, fruits, insects and birds. Apparently it is a matter of availability of the food that counts with the fox. In other words, if it is easy to get, then he eats it and won't bother looking for something that is scarcer or harder to catch. Many studies have shown that game birds are insignificant in the diet of the fox; this information is reported from Michigan, New York, Iowa, Ohio, Pennsylvania, Virginia, and other states.

Poultry is a matter of convenience to the foxes. If found on open and unprotected ranges, then fox damage



The wise course, when rabies is present in a wild animal population, is to reduce the number of animals in the affected area. Intense trapping is the safest method of accomplishing this end.



A few simple tools and a little know-how are all that is required to trap foxes in areas where rabies is a public health problem.

will occur and continue to occur until the individual fox is removed or the poultry is protected in some other manner.

It must be remembered that the significance of fox predation upon any species can only be evaluated if the population of the species is known. For example, if rabbit appeared in 25 percent of a sample of fox stomachs, we don't know if that percentage represents five or 50 percent of the total rabbit population involved in that particular area.

The entire fox population is often accused of wholesale slaughter of game birds and mammals by many people, but they usually don't have the evidence to prove their statements. It is mostly hearsay with them. On the other hand, the fox is no angel and will get his share of game if it is available to him.

Economic Importance

The value of any fur is primarily governed by fashion, and since red fox fur is not in style, there is little or no demand for his pelt. Southern-produced furs have never brought the price nor been in as great demand as northern-produced furs. This is particularly true of the long-haired furs. It is due largely to the texture of the pelts, which is dictated by temperature, moisture and many other factors. In the past, red-fox pelts have brought as much as \$40 for No. 1 extra large pelts. This figure is believed to be an all-time high for New York state. Today a No. 1 extra large pelt in Virginia might bring \$2 to the trapper. An average price on red-fox pelts is approximately \$.75 to one dollar in this state.

Fox hunting is more than a sport in some sections of Virginia—it is a business. Large sums of money are spent on horses, hounds, kennels, licenses, veterinary fees, feeding, livery and all the help required to handle these items. This doesn't include the costs involved in transportation, meals and lodging at one or more field trials each year for the average fox hunter. The total figures probably are somewhat over \$100,000,000 over the entire

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Commission Photos by Kesteloo

Neither a toad nor a frog, the eastern spadefoot is one of our most peculiar amphibians and is only rarely seen by the average person.

The Eastern Spadefoot --

Storm Frog of Eastern Virginia

By W. LESLIE BURGER

*Assistant Professor of Biology,
College of William and Mary*

SOON after heavy spring and summer cloudbursts, Virginians have a brief opportunity to see a rather peculiar amphibian, the eastern spadefoot. Since it is tailless, it belongs in the general group of frogs and toads, the order Anura; but, strictly speaking, it is neither a toad nor a frog. Like the tree frogs or tree toads (take your choice), the spadefoots are intermediate—just as terrestrial as the common toads (species of *Bufo*), but with skin as smooth as many true frogs (species of *Rana*).

The hard, sharp-edged tubercles on the hind feet of spadefoots are the specialized digging devices for which these "toads" are named. No other Virginia amphibian has such well developed spades. In bright light the pupil of the eye is a vertical slit, while in all other North American amphibians the pupil is circular or very nearly so. Because of these and other features, including a number of anatomical peculiarities, zoologists place the American spadefoots in a special group, the genus *Scaphiopus*.

Reproduction

Spadefoots are as distinguished in habits and physiology as in structure. General activity, breeding, and early development of these anurans follow extremely characteristic patterns. During or soon after a rapid rain

of several inches, the male eastern spadefoots migrate from their burrows to temporary pools, often in low parts of cultivated fields. Since they are seen in large numbers only after cloudbursts, some people call them storm frogs. The migration and the mating behavior that follows is a response to low atmospheric pressure. In the laboratory, low pressure produced in vacuum jars stimulates mating of eastern spadefoots.

Once the males reach a suitable pond, they sound off with a loud hoarse snore, something like the call of young crows. Attracted by the call, additional males and, later in the evening, females gather and a chorus of dozens or even hundreds of spadefoots resounds. These enthusiastic lovers make a full night of it and only one night have I watched to the end. With the first signs of dawn, the chorus ended and the toads climbed one by one from the pond and burrowed into the banks. This spectacle may be over in one night or last through several successive nights. One night this spring, March 22, several hundred individuals were singing in a corn field near Kiptopeke Beach (eastern shore). The accompanying photographs show individuals from this chorus.

Such gatherings of spadefoots play an important role in their reproduction. Mating and egg-laying are the direct results.

Early Life

Development of the egg and tadpole is extremely rapid. At ordinary temperatures the fertilized eggs hatch into tadpoles in about two days, and after a growth period of about three weeks the tadpoles crawl from the water as tiny adults. Tadpoles of one western spadefoot, *Scaphiopus holbrooki hurteri*, sometimes complete development from egg to new adult in as few as twelve days. This contrasts with periods of development of 50 or 60 days in most toads, 70 to 90 days in the leopard frog, and one to three years in greenfrogs and bullfrogs.

The tadpoles are shaped like a banjo, with body large and bulging on the sides. Dr. Arthur N. Bragg, who has studied spadefoots intensely for years, writes the following about the tadpoles.

"Typically they move nearly all the time, pausing here and there to feed. Collectively, they search all regions of the pool's bottom and feed upon all sorts of organic materials encountered. If these are abundant, their growth is normal and rapid. If not, they ingest large quantities of the bottom mud taking from it anything of nutritional value; and their growth rate will vary with their success.

"If nutritional conditions for them become very poor (and sometimes even when this is not true) some species become social and cooperate in securing food. The solitary spadefoot, as well as its close relative, the Savannah spadefoot, the southern spadefoot, and the plains spadefoot have all been seen to do this at specific times and places.

"The cooperation takes the form of a dense school of tadpoles, swimming together as fishes sometimes do. Such a school moves slowly, each tadpole lashing its tail violently so that the collective effect makes a current through the mass of animals, so stirring up the bottom mud that a cloud of particles, dead leaves, small twigs, and smaller pieces of detritus passes out behind the school in a steady stream. Each tadpole takes in what it can get from the materials so stirred. In the Savannah spadefoot, I have seen thousands of animals in such schools. Any plankton organisms (small algae, crustaceans, etc.) which are caught in the vortex at the head of the school are captured also as they pass through the densely packed mass of tadpoles.

"Furthermore, should a tadpole be killed or injured in the general melee by a predator such as a water beetle, it immediately becomes food for the others. Occasionally, several may be injured and others harmed by the crowding to get at the victims. In such situations, the whole mass may suddenly become rabid cannibals, attacking

and tearing each other to pieces.

"All of this behavior, including the cannibalism, is biologically sound; for the water level is usually falling rapidly and if the tadpoles cannot complete their aquatic development before it disappears, all will die. It is obviously better for the species that some should be eaten by the others, thus giving them a better chance to win the race with evaporation and therefore having a chance to produce other generations of adults, than that all should succumb. Here as elsewhere in organic nature, it is the survival of the species, not of the individuals *per se*, that is important.

"If the water level falls dangerously low just before the tadpoles are ready to leave the pool, they often congregate into *non-feeding* groups with fastly moving tails. In this way they eventually scoop out a depression in the bottom mud into which the last water flows as evaporation nears completion. In such a depression, the surface exposed to the air is lessened, thus cutting the evaporation rate, and this may give the animals enough time to get ready for transformation. An hour or less thus saved may make the difference between life and death for thousands of tadpoles.

"Even so, the race between developmental rates of the tadpoles and evaporation of the water is often lost by the animals so that all are killed. Even then they serve their species: their bodies add to the meager organic materials in the pool site so that the next generation of tadpoles may have a better chance to come through to the terrestrial phase of existence before the water totally disappears.

"In the Savannah spadefoot, still another kind of social aggregation of tadpoles has been observed four times, twice during different years in one pool site, once each at two others; from indirect evidence many other instances are strongly suspected also to have occurred. I happen to be the only one who has reported this and, therefore, it needs the confirmation of other workers. I call it metamorphic aggregation. What I have seen is this: Tadpoles approaching the time of emergence from the pool form dense non-

feeding aggregations in which each swims slowly about. Such groups may remain together for several hours or an aggregation may break up and reform several times. In either case, they await the coming of darkness, then suddenly all emerge to the bank and crawl out. I have seen thousands of them reach the bank within ten minutes. Tails then begin to shrivel rapidly and other changes take place so that in a few hours each tadpole

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Note the well developed spades on the rear feet. With a shuffling of the hind legs, it is a curious sight to see a spadefoot disappear rapidly backward into the soil.

For Goodness' Sake, Take Them With You!

By GERTRUDE CURTLER

Former Editorial Assistant

OF COURSE children should explore our woods, mountains, lakes, beaches, and streams. An early introduction to wildlife and its surroundings furnishes an outlet for their energies, starts them off on any one of a number of hobbies and teaches them important things including an elementary knowledge of conservation. It also plants in them the seeds of good sportsmanship. Good sportsmanship is usually thought of as a product of the playing field, but there the emphasis is on winning. A day's hunting or fishing, on the other hand, is successful whether or not one comes home with a trophy. Just being out in the wide open spaces—breathing the air and seeing the trees, birds, small animals and clouds—is enough. Our speeding, pressure-filled daily life is becoming increasingly competitive and materialistic; it is not how you conduct yourself but how much you bring home which counts in the world's eyes. But the child who is interested in wildlife, and who associates with the sort of people who like to fish or hunt or photograph birds, gains values which are truer and which are far more likely to make him a contented and valuable person.

People who work with children in trouble (let's try to avoid the term 'juvenile delinquent') invariably find that in their rehabilitation an active interest in wildlife is therapeutic. Almost everyone agrees that the reason for youngsters getting into trouble is the lack of an adult's attention, interest and guidance. When this lack is filled, as it is in training schools (the term 'reform school' is no longer used), they open up and respond to an astonishing degree. And, as most training schools are in the country, one of the first things to which they respond is often nature. "I never saw a tree till I came

out here!" one girl told an assistant out at Bon Air School for Girls. What she meant was that she'd been so withdrawn and indrawn and taken up with her own problems that she'd never before noticed trees. Or birds. Or flowers.

Bon Air School is physically lovely. Wide, rolling lawns, neat flower beds and clipped hedges, and huge, old, spreading trees—all bounded by uncleared woods

full of red bud, dogwood and rhododendron. The girls frequently take walks through those woods and they are fortunate in that one of their social workers is an amateur ornithologist. Because of her the girls have become interested in birds, and have erected and tended many feeding stations throughout their campus. They are full of eager questions and anxious to learn. Once a city girl spied a cardinal, blue jay and starling all at the same time—and it was the high spot of her week. Flowers too, 'specially wild flowers, have captured their interest. They often bring wild flowers back from their walks to use as center pieces in the dining

room. For most of these girls this is the first attempt at flower arrangement. Finding the flowers and attempting to create something decorative with them is not only a source of current satisfaction, but is something they probably will retain for the rest of their lives. The chances are that girls who have learned to take pleasure in the outdoors and the wildlife in it will not again need to look in unhealthy directions for interests and creative expression.

In the case of boys, an appreciation of wildlife can be even more helpful; for with them it can be a powerful preventative. Most boys in trouble come from congested slum or near-slum environments where there is little



Commission Photos by Kesteloo
The child who is interested in wildlife, and who likes to hunt and fish, is likely to gain values that will keep him out of trouble and make him a contented and useful person.

or nothing to take up their time between school and bed. If they did have interests or occupations, they probably wouldn't get into trouble. Judge Kermit V. Rook, a Richmond Juvenile Court judge who is also an enthusiastic angler and hunter, feels that acres of natural woodlands should be reserved outside all big cities for the express and sole benefit of the city's boys. Although training schools are nearly always in the country, the boys don't get much opportunity to hunt or fish while there. Even if they did, the benefits of the hunting and fishing would probably be offset by the stigma of being in the institution. But in these special boy-areas of Judge Rook's there would be no stigma. And there would be ample opportunity for hunting and fishing and nature study and hiking and any of the other hundred and one healthy progressive pursuits of the outdoors.

Judge Rook condemns his own idea as unrealistically idealistic. On an organized scale perhaps it is at the present time. But why couldn't hunting and fishing clubs adapt it to invite underprivileged or neglected kids out to their lodges or lakes from time to time? Individual sportsmen, too, could help by not just mouthing but actually obeying the slogan—'take a boy fishing.'

A fourteen-year-old boy talking from the pulpit of our church on Youth Sunday made a good point. He said the familiar phrase of which most parents are guilty, "Don't bother me now, can't you see I'm busy?" could be responsible for a good bit of juvenile delinquency. For after all, the adult from whom a child most wants attention and companionship is his parent. If for some reason a parent can't give it to him a substitute adult might be used, but the parent is always first choice. So one way to make sure that your child does not retreat into trouble is by taking him with you when you go fishing, hunting or exploring the woodlands.

In this day of blaring radios, clacking typewriters, ringing telephones, honking horns and screaming television sets, more and more people are clapping their hands to their heads and bolting for the woods. Which usually means leaving Junior, who was responsible for the screaming television set, behind. Or Sister Susie, who was the one to blame for those jive records apounding from the player in her room. Bolting from all that noise is an understandable and forgivable impulse; but if you could curb it and take those two kids along you'd probably be glad for the rest of your life that you did. For in the woods, on the edge of a brook or sitting side by side on a fallen log, you might get the opportunity to communicate with them as you never could back home with the ringing telephone, clanging doorbells, honking horns and all the rest of it. Then, too, you might be starting them in on an interest which you both could share and which would serve as a basis for friendship forevermore.

Just a simple thing like a family picnic in forest, park or beach can knit a family together and also do a lot for the youngsters. Not the sandwiches-wrapped-in-waxed-paper sort (although those have their value, too) but

(Continued on page 24)



It is a rare youngster who doesn't have an interest in wild animal life. You will even see them crowding around indoor wildlife exhibits.



A hike in the outdoors is not only good physical exercise; the beauty of picturesque scenery is good for the mind.



Next time you stow your gear into your car, instead of dashing off alone into the woods, take the children with you.

Hunting, Fishing and Recreation in Chesterfield

By T. D. WATKINS

Commissioner, Third District

CHESTERFIELD COUNTY was a land of plenty for the early settlers, who subsisted on its abundance of game and fish. It is bounded on the north-east and east by the James River and on the south by the Appomattox River, with Swift Creek cutting through the center. Fishing in these bodies was excellent the year around, especially in the spring when the shad and herring were running. Situated in piedmont Virginia, the county is mostly flat to gently rolling, and was covered then with pine and hardwood forests. In these forests abounded deer, wild turkey and squirrel. Ducks and geese were plentiful in fall and winter. Small game, including quail and rabbits, was only found in and around open land, of which there was little.

As civilization advanced, forests receded, quail and rabbit became more plentiful and deer and turkey declined in numbers. Farms grew numerous and game and fish gradually became less essential for livelihood, until today hunting and fishing are sports regulated by seasons and bag limits to perpetuate the species, and participated in by at least one half of our population.

Beaver, muskrat, fox, skunk, mink and otter were among the county's early furbearers and they still inhabit its swamps, streams and marshes. At the present time, Chesterfield has the largest beaver population in the state and some few are trapped for fur by special permit issued to the landowners where the animals are in conflict with man's interest.

In colonial days, fox dogs were brought over from England and the "gentlemen's sport" of fox hunting, or "riding the hounds," became quite popular. Foxes are still numerous and the sport has continued to the present day but is very much on the decline due to high mortality of hounds hit by cars as they chase foxes across the heavily traveled highways.

At present, Chesterfield has a fairly large deer population, which is expected to increase in the face of Virginia's wise management of her deer herds. For the most part, these herds are centered on the timberland in the Clover Hill district, along Swift Creek and the Appomattox River, where browse is plentiful.

There are a good many flocks of turkeys in the same areas, but the pressure of civilization is reducing wildlife habitat near centers of high population and hunting pressure is becoming so heavy that one wonders how any are left. They surely will decline as their ranges decrease.

Quail and rabbit are rather abundant and should increase. Food and cover are their essential requirements, and farmers are being encouraged to leave cover wherever possible and to plant food patches for game. These farm game species are more tolerant of man and will increase where management practices are put into operation.

Chesterfield does not have many waterfowl as it has very few marshes. Several years ago Mr. A. D. Williams

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Commission Photos by Kesteloo

Chesterfield County is blessed with abundant fishing waters. The James River, located here, is one of the best smallmouth bass streams in the state.



There are a good many flocks of turkeys in this area even today. One of the Chesterfield County game wardens, Joe Bellamy, displays a fine gobbler taken in the county during last year's hunting season.

VIRGINIA WILDLIFE

CONSERVATIONGRAM

Commission Activities and Late Wildlife News . . . At A Glance

SEASON SET ON DOVES, RAILS AND WOODCOCK. According to I. T. Quinn, executive director of the Commission of Game and Inland Fisheries, the United States Bureau of Sport Fisheries and Wildlife of the Department of the Interior informed the Virginia Commission that the outside dates for taking doves, rails and woodcock have been fixed. They requested the Commission to fix within such dates a 60-day open season on doves, a 70-day open season on rails, and a 40-day open season on woodcock. The Virginia Commission of Game and Inland Fisheries has established September 16 to November 14 as the open season on doves; September 16 to October 31 for rails, and November 18 to December 27 for woodcock. The daily bag and possession limit on doves will be 10 and 10; on clapper rails, 15 for bag limit and 30, possession limit; sora rails 25 and 25; and woodcock, bag limit 4, and possession limit, 8. While the period allowed for shooting rails is 70, the same number of days allowed as last year, the Game Commission allows only 46 days for these reasons: If Virginia took advantage of the full 70 days, the season would have to start early in September and continue into November. Too many clapper rails are immature prior to the middle of September. Waterfowl begin to come into the Eastern Shore area by October 31, and shooting clapper rails after that date would give a great many hunters the opportunity to shoot under the pretext that they were out after rails.

4000 ACRES OF MARSHLAND PURCHASED BY COMMISSION. Virginia's Attorney-General has approved the deeds providing for the purchase of 4000 acres of marshland for the Game Commission. This property is located in the northwestern part of Accomack County on the Eastern Shore. Plans for these wetlands to be used for a refuge are not probable, and public shooting possibly will be allowed.

GAME WARDENS RETIRED AND APPOINTED. L. Ashton Coleman, game warden for Amelia County, has retired after serving the Commission for thirty-five years. He has been replaced by James E. Allen of Amelia. Cato L. Collins of Emporia has been appointed to fill the vacancy by the retirement of P. F. Squire, game warden for Greeneville County. W. C. Irby, game warden for Nottoway County, turned his enforcement duties over to Charles H. Wells, of Crewe, on the first of July.

RECORD MARLIN CAUGHT BY WOMAN. An all-time record was made by Mrs. Ross Walker, whose husband is on the Water Control Board, when she pulled in a 415-pound marlin off Cape Hatteras. It took 78 minutes to land him, but Mrs. Walker is a veteran in capturing big fish. She also broke a record in 1952, but this year's prize surpasses all in size from Bimini all the way up the East Coast.

SURVEY OF NEW RIVER MADE. The fish division of the Commission of Game and Inland Fisheries is at present making a survey of the New River and southwestern tributaries for information of sport fishing potentialities. From this research, says Bob Martin, assistant chief of the fish division, sufficient management recommendations will be furnished.

SUMMER SHORT COURSE FOR FIELD STAFF AT V.P.I. SUCCESSFUL. The Game Commission conducted an impressive school for 189 members of its field staff at V.P.I. this summer. Programs were presented by each division of the Commission; Education, Game, Fish, and the Law Enforcement chiefs instructed and discussed all phases of their work. Laudable reports have been received for all participating. A very interesting innovation this year was an instruction class given by Sgt. M. H. Kent, of the State Police, on lifesaving, first-aid, self-defense, how to handle a gun, and judo, a modified version of jujitsu.

NEW F. & W. S. ADVISORY GROUP—OUTSTANDING CONSERVATIONISTS. The newly established advisory committee to the Assistant Secretary of the Interior for Fisheries and Wildlife held its first meeting in Washington, D. C. on June 12 and 13. Twenty-four prominent conservationists, representing wildlife, sport fishing, and commercial fishing fields, accepted invitations to become members of the committee and are serving as advisors in an individual capacity rather than as representatives of organizations. Secretary of the Interior Fred A. Seaton approved establishment of the committee to give the Department the benefit of additional advice on implementing the Fish and Wildlife Act of 1956, which became law last August.



Dr. Leslie Burger and research assistant Larry Toolin on a typical collecting trip to Hog Island in Surry County, Virginia.



As it is with all wild creatures, the best collecting areas are those that furnish food and cover. This submerged brush pile was a productive location.

COLLECTING — A Means Of Learning

Distribution patterns of amphibians (frogs, toads and salamanders) in Virginia are not as well known as those of our mammals. One way an animal might be found in any given locality is to collect it. This is the job of a biologist. The biology department of the College of William and Mary is a study. Here and at other institutions throughout the state, the goal is to add to our knowledge of these lesser-known animals.



An assortment of turtles and turtle-collecting equipment. Note the common snapper crawling away and the several painted turtles.



This is the business end of a copperhead snake. The fangs are extended to the striking position. They are like hypodermic needles.



The best method of preserving a large animal is to inject the body cavity with formaldehyde and then submerge it in the same fluid.



Here is a collection of green tree frogs. At certain seasons of the year frogs and toads congregate in large numbers.

g More About Virginia's Animals

amanders) and reptiles (snakes, turtles, skinks and lizards) and birds. The only way to definitely establish where a wild mens and have them positively identified by a competent and Mary at Williamsburg, Virginia, is undertaking such biologists are conservatively building a study collection Virginia's fauna.

Commission Photos by Kesteloo



A zoological collection, like a library, to be of much use must be carefully catalogued and kept in order for quick reference and comparison.



Dr. Burger marks on a county map the exact location where each specimen was collected. Thus, over a period of time the range of various animals form a pattern and proper distribution is established.

WORLD AFFAIRS AND OUR NATURAL RESOURCES

By GOVE HAMBIDGE*

THE topic assigned me is world affairs. It is a nice large subject—very much like having a bear by the tail. The question is where is he going to take you?

The discussions this morning have covered wide fields—land use, industry and business, national welfare, national security. I like this way of beginning a conference. What you are doing is to set your special interest, wildlife management, in a framework that shows its relationship to other basic and important things.

The discussions have been concerned with national questions. As a representative of the Food and Agriculture Organization of the United Nations, I am going to take you into the international field. I shall not hesitate to plunge into a very broad-scale discussion, because in my experience people who are seriously concerned with wildlife management and conservation are likely to be people with a broad humanitarian outlook. That is natural, I suppose. No one can be closely associated with fields and forests, the seas and rivers and lakes and

*As North American Regional Representative of the United Nations Food and Agriculture Organization, Mr. Hambidge delivered this address before the Twenty-First North American Wildlife Conference, New Orleans, La.

the sky, without having the kind of vision that takes in large horizons and looks outward on the universe.

Essentially, your concern is the sound management of certain of the earth's most fundamental living or biological resources in order that man may enjoy them for a period as close to perpetuity as we mortals can envision. What I shall be talking about this morning is sound management not only of these resources but of the whole earthly setting of which they are a part, and of which man himself is a part.

If you will drop the word *wild* from the name of your institute (Wildlife Management Institute) for the next fifteen or twenty minutes and think of it as something even bigger, the *Life Management Institute*, we shall be talking the same language.

World affairs are in an interesting and precarious state. What is the first thing you think of when you hear that phrase, *world affairs*? The first thing I think of is the overwhelming fact of life today—the new possibility of total or almost total destruction of the living resources of this planet through international conflict with atomic and nuclear weapons. If such a conflict should occur, we



U. S. Forest Service Photo

Good forestry practices are a must if a nation is to retain its rank in world affairs.



V. C. C. Photo by Flournoy

In the future, our oceans may be an important asset in contributing to the world food supply.

might have some wildlife left in places, but there might be little else—probably no civilized life as we know it.

I am sure you will agree with me that the *first* preoccupation of men and nations today is and must be the effort to eliminate the possibility of this kind of conflict. I am optimistic enough to believe we can do it; but as the Secretary of State has pointed out, it would be reckless to assume that, because we know modern weapons in a major war would destroy a large part of the human race, this knowledge in itself will forever prevent the occurrence of war.

Few of us can participate directly in the kind of negotiation required to provide adequate insurance against conflict with these terrible weapons. A great many of us, however, are involved, directly or indirectly—and I believe many more of us will be in the future—in another kind of effort just as important for creating an environment favorable to lasting peace. This is the effort to remedy conditions that have always been among the principal causes of armed conflict.

I speak of hunger, poverty, ignorance, disease, frustration, which in too large measure are the lot of too large a part of the earth's people. These are conditions that breed discontent and unrest, and lead to rebellion and revolution; and because violence in these forms could be the spark that sets off a world conflict, we must in this atomic age do everything we can to forestall it.

My remarks this morning are concerned with the effort to change these dangerous conditions by peaceful methods before men resort to violent ones.

I speak of what we rather awkwardly call the economic development of under-developed countries, through what is awkwardly called technical assistance, or technical cooperation. Next to direct negotiations concerned with armament control, I regard this business of widespread economic development as the most weighty and important business in world affairs today. This business is

essential to economic health; and as long as there are immense sick spots and sore spots in the world, as there are now, much of the world cannot have the economic strength and material well-being, and a large share of the world's people cannot have the freedom and opportunity, which are the foundation stones of peace.

Now I want to take you to a high place and give you a quick bird's-eye view of this movement for economic progress which has suddenly become worldwide in the past few years.

It started at the end of the war as a large-scale drive for relief, rehabilitation, reconstruction—a drive based on the necessity for quick repair of the damage caused by the most destructive of wars if the world was to escape a long period of despair. But the relief and rehabilitation aspects soon merged into something more long range and forward looking when the United States Government called the Conference on Food and Agriculture at Hot Springs, Virginia, in 1943. That conference resulted in the setting up a couple of years later of the Food and Agriculture Organization, FAO, the first of the new United Nations agencies, born even before the United Nations organization itself.

Thus, significantly, I think, the first of the new international agencies was concerned with nutrition and agriculture and forestry and fisheries; with man's fundamental needs, food, clothing, shelter; with better use and management of the living resources that provide these things; with the innate longing of most human beings for a life less heavily burdened with hardship.

Significantly, too, the first of the new international organizations was essentially scientific and technical rather than political in nature.

Significantly, it was based on the progress made by science in opening up great new possibilities for improving the production and processing, handling and distribution of the things needed for higher living standards and enhanced welfare.



The productivity of impounded waters can be greatly increased by the addition of fertilizer. A great deal of this work has been done in recent years.



S. C. S. Photo by Hufnagle
In many parts of the world, including our own country, vast areas of rich grassland have been ruined by overgrazing.



A good approach to world peace is through the establishment of conservation practices to provide adequate food in starving countries.

Significantly, it took the form of a cooperative international effort to make the necessary knowledge and equipment so widely available that a large part of mankind could achieve greater abundance than man had dared to think possible before. Men were to cast their knowledge upon the waters of good will in the belief that it would return to them many fold.

FAO was one of the catalytic agents that helped to stimulate this drive for economic development and get it off to a vigorous start. But the movement soon grew far beyond FAO. Other agencies came into the picture, notably the International Bank for Reconstruction and Development, the World Health Organization, UNESCO. They are international. FAO, for instance, is a cooperative of 72 governments, and its staff and its funds come from the entire membership, though the U. S. contributes the largest single share.

But the effort very soon spread beyond these international agencies. In fact, the bilateral or so-called Point 4 program of the U. S. Government and the essentially bilateral program of the British Commonwealth countries in the Colombo Plan soon far exceeded the operations of the strictly international agencies, both financially and in the numbers of professional workers involved.

In addition, there has been a great enlargement of technical assistance work on the part of private foundations, notably the Ford Foundation and the Rockefeller Foundation, but several others also; and religious missionary groups have enlarged their work overseas in rural development, in medicine, in education; colleges and universities have taken an increasingly dynamic part in the whole movement, to such an extent that I think every land-grant college in the United States now has members of its staff working in one or more countries abroad, usually on contract with the federal government.

So you now have a tremendous ferment of activity. Toynbee once said that our age may go down in history not as the age of destruction but as the age in which man dared for the first time to think that every human being can share the benefits of modern civilization. In a nut-

shell, I suppose, that is the meaning of this drive to widen the horizons of opportunity which has become so dominant a part of the life of our times.

Practically all of the work of FAO has at least an indirect conservation aspect in the sense that it is profoundly concerned with better use and management of the renewable resources of land and sea. A fair amount of the work directly involves conservation.

Let me give you two or three examples, first commenting that while most programs are carried out within individual countries, governments are also using FAO as a means of organizing cooperative regional efforts to deal with problems common to a number of neighboring countries. In the Mediterranean area and the Near East, for instance, there has been serious deterioration of vast areas of grassland through overgrazing and haphazard management. Considerable parts of this great semi-arid region are peopled by wandering Bedouins perpetually on the move seeking fresh grass for their flocks and herds.

To bring about better management of these range lands is a difficult task, since it involves changing ancient ways of doing things, deeply embedded in law and custom. But changes there must be because the very life of the region depends on water; and the great guardian of water is vegetation; and extensive, serious damage to the vegetative cover is like condemning the thirsty land and people to slow death. A number of these countries are now combining through FAO on a promising program of research and experiment designed to determine what grasses and other forage plants are best adapted to the needs of the area and what management practices are required to maintain a favorable balance of plants, animals and people.

In the Far East the International Rice Commission, a FAO organization, has brought many countries together in an effective program for breeding better rice and making many other improvements in rice production. Rice is the staple food in much of this region. If, through



Virginia Cooperative Wildlife Research Unit Photo by H. S. Mosby
The Food and Agriculture Organization (FAO) is an international agency which makes available knowledge and equipment for increasing renewable resources the world over. Wildlife benefits when conservation programs are enacted.

the use of better varieties or otherwise, the same amount can be grown on four acres that previously required five, you have an extra acre that might be put into legumes or grasses or other plants, thereby diversifying agriculture and protecting soil fertility.

In the Far East, the Near East, and Latin America much skill and effort is now focused on improving livestock production—in particular, combating widespread diseases such as rinderpest through new methods, cooperatively applied. I need hardly emphasize to this group that better soil management and expanded livestock production often go hand in hand.

In forestry the principal effort is to bring about a wider realization of what sound forest management is and to help governments institute the laws and establish the organizations required to put it into practice. Essentially this means going over much the same road that this country traveled in the long struggle to put forestry on a sound basis. The FAO regional forestry commissions are all working on one or more aspects of this big problem. In the Near East, one of the main concerns is to bring back some of the forest destroyed long ago and urgently needed for soil and water protection. In parts of Latin America, a pressing problem is to make far better use of large forest resources now either scarcely utilized or, at the opposite extreme, wastefully exploited without regard to the requirements of sustained yield.

The potential contribution of fisheries to the world's food supply is a good deal larger than the actual contribution today. One need is to prevent a great deal of waste in the handling, processing, and transportation of a perishable product. Another is to increase the efficiency of millions of fisherfolk who are so desperately poor that they have neither the boats nor the gear to go far enough offshore for a good catch.

One of the most interesting developments is the rapid expansion of inland fish culture in ponds, streams, brackish waters, flooded rice fields. By stocking his rice paddy with fish, the peasant farmer kills three birds with one stone. He provides a natural fertilizer that increases his rice crop; he gets a very sizable supply of good protein

food from the same land that produces the rice; and he effectively reduces the mosquito population.

As for the work of FAO in improving nutrition, it is a vital aspect of the conservation of human life itself. Malnutrition, inefficiency, disease, and frustration are a vicious circle. Our concern is to break it at the point where nutrition is involved. Consider rice processing, for instance. Millions of human beings live almost exclusively on a rice diet. Yet a good deal of the rice they eat is so highly milled and wrongly handled that it loses disastrously in nutritive value. FAO is very concerned with getting better milling and handling practices widely used so that vital minerals and vitamins can go into human stomachs instead of being thrown away.

These sketchy random examples are not intended to give an adequate idea of our work. I have not even mentioned, for example, the project we are now planning to carry out—an international survey of the world's potential production of food—the most comprehensive ever undertaken, to see how it matches prospective population growth. Nor have I mentioned the possible use of atomic energy in agricultural production and related fields—a possibility fraught with dangers as well as benefits.

You can read about these things elsewhere. Here, I am more concerned to leave you with the conviction that the work of FAO and its sister agencies, national and international, public and private, adds up to one of the most significant of all man's ventures into new realms of human well-being—a venture that must succeed if there is to be any world for our children and grandchildren to inherit.

I am concerned, too, to show that the heart of this work is better management of the earth's great living resources; and because this is so, it is very much up your alley as experts in—I repeat—*Life Management*. I would suggest, in fact, that you ought to scrutinize the work of FAO and similar agencies with special care to make sure that they pay enough heed to conservation for their own good. Far better than most people, you realize how easy it is to neglect that aspect in the pressing, persistent drive for greater production.

Things You May Not Know

The showy tail of the squirrel is not used strictly as a decorative feature. This appendage is very necessary in maintaining correct balance and serves as an extra blanket for sleeping during cold weather.

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Frogs and toads use their eyes to help them swallow. The eyeballs are retracted and this helps to force the food down the throat.

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The feathers of birds are more closely related to the scales of reptiles than to the hair of mammals.

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Frogs breathe by swallowing air. These animals have no ribs and therefore cannot breathe by expanding and contracting their chests.

The Woodpecker in Tradition and Conservation

By EDDIE W. WILSON

SINCE the woodpecker is widely distributed throughout the world, it is not surprising that it has become an object of human interest. Like the owl (as pointed out in my previous article on that bird, published in *Virginia Wildlife* in 1949), it has been considered traditionally and economically since the earliest days.

In tradition the woodpecker may be a symbol, a prophet or a benefactor to man. It may even take on a supernatural aspect. Philosopher, naturalist, novelist, and poet have regarded the woodpecker through the ages.

In Greek mythology this bird is first mentioned in association with the almighty Zeus, the supreme ruler of the universe, wisest and most glorious of the divinities. He sometimes took the form of the woodpecker, and it was sacred to him alone. In Crete it was venerated as the "axe-bird" (the axe being a sacred object) because of its chisel-like beak. In Mesopotamia it was associated with Ishtar, the chief goddess, the mother-goddess of Babylonia and Assyria; and here it was given the poetical name, the "axe of Ishtar."

Aristotle, the Greek philosopher (384-322 B.C.), records in his studies on natural science that a woodpecker was known to place an almond in a chink of wood, and then break it at the third stroke of its bill in order to get at the kernel.

Pliny the Elder, Roman naturalist and author (23-79), ranks the woodpecker as a bird of "first rank in auguries in the kingdom of Latium," and he adds that persons carrying about with them the beak of a woodpecker would never be injured by bees, wasps, hornets, and leeches.

Plutarch, the Greek biographer (46 A.D.-120 A.D.), states that the woodpecker was sacred among the Romans because of the following legend:

The twins, Romulus and Remus, were thrown into the Tiber by order of Amulius, king of the Alba Longa, who feared they might usurp his throne if they were allowed to reach maturity. They were washed up on the bank. Here they were attended by a woodpecker and a she-wolf who cared for their every need. Finally they were found by the shepherd Faustulus. He took them to his wife, Acca Laurentia, and they were reared by her. Romulus later became the founder of Rome.

As the bird of Mars, Roman god of war, the woodpecker was said to prophesy, perched on a

pillar of wood in a certain sacred grove.

Norse mythology places the woodpecker as one of the ancestors of Odin or Woden, the chief god of the Norse pantheon, the god of war, of wisdom, and of poetry.

In folk belief, the bird was considered by the people of Sweden to bring bad luck if killed, whereas in Shropshire, England, it was thought to prophesy rain.



National Audubon Society Photo by Allan D. Cruickshank

The pileated woodpecker is a beneficial bird. Many wood-boring insects are eaten each year by this species.

Moreover, the woodpecker figures prominently in the beliefs and ceremonial rituals of the various American Indian tribes, and here it was also an economic factor.

In the Hako, a Pawnee ceremony, the woodpecker symbolized parenthood. Also, its head was carried on a stem in this rite as "it has the favor of the storm gods and can avert from man the disaster of tempest and of lightning."

Among the Osage, the pileated woodpecker was a life symbol of the principal war gens of the Tzizhu tribal division. And here it symbolized, also, the sun, the moon, and the morning and evening stars.

The woodpecker head on the tribal pipe of the Omaha signified the unity of the authority of the chiefs. In Omaha myth, the bird was associated with the sun, and also it was the patron-saint of children since it was observed to keep its own family in so safe a place.

The Salishan magician-medicine man, during his treatments, made woodpecker feathers stand on end, without visible aid.

A Blackfoot medicine man once said that a woodpecker taught him songs and how to use them in curing the sick.

A certain Jicarilla text gives a picture of perfect contentment. Here the woodpecker is speaking:

"I like to climb trees. I live among them because no one talks to me. I peck holes with my hard bill. I raise my children in the holes I make. That is why I like trees. . . . Whatever happens I do not complain because I have supernatural power. . . . Although I peck with my bill all day my head does not ache. . . . I go among trees all the time because I like them very much. . . . I sleep well in my house."

From an economic standpoint there was a trade in woodpecker feathers among the Hupa Indians since the women wore them attached to their shell-ornaments; the dancers wore circular bands with woodpecker appliqué; and among the payments made for a wife were woodpecker scalps. Wealthy Wiyot men wore headdresses made by sewing the scalps of red-headed woodpeckers on a broad band of deerskin. Among the "valuables" put in Yurok graves were woodpecker scalps. Pomo baskets ornamented with feathers of the red-headed woodpecker were especially prized. Among the Maidu, woodpecker scalps were a common medium of exchange. The Maidu obtained these in trade with the Wintun.

Today, conservationists consider, generally speaking, that woodpeckers are of economic importance. They are beneficial inasmuch as they keep in check the borers concealed beneath the bark of trees. This statement is confined, however, to the ivory-billed, the pileated, the hairy, and the downy woodpeckers and the flicker.

The red-headed woodpecker is especially fond of beetles and among these are certain carnivorous ones which are more or less useful.



Photo by Leonard Lee Rue III

The downy woodpecker, which is very similar to the hairy woodpecker, is also a consumer of wood borers.

Yet, decidedly undeserving of encouragement is the yellow-bellied woodpecker, or true sapsucker, since it habitually feeds upon the sap of trees, thus damaging sugar maples, fruit and shade trees.

The notes of the woodpecker were considered by Tennyson as "wild and shrill laughter" and he referred to the bird as "jubilant." Gilbert White, the English naturalist, called the woodpecker's notes "a sort of loud and hearty laugh." Thoreau says in his *Journal*, March 22, 1853:

"The tapping of the woodpecker, *rat-tat-tat*, knocking at the door of some sluggish grub to tell him that the spring has arrived, and his fate, this is one of the season sounds, calling the roll of birds and insects, the reveille. . . . Is not the woodpecker our first woodland bird, come to see what effects the frost and snow and rain have produced on the decaying trees, what trunks will drum?"

In conclusion, this study of the woodpecker is suggestive rather than exhaustive. It is evident that this beautiful bird is worthy of further consideration along various lines of research.

country. Even with 200,000 people and 800,000 hounds involved, the sporting potential of foxes is not fully exploited.

A final item of value is the esthetic value placed on the red fox by a few outdoorsmen, who enjoy tracking a fox or the pleasure of seeing a fox or a litter of pups in the field. If the red fox were removed entirely from the American scene, something would be lacking from nature as we know it today.

Other Facts

The one important factor remaining for discussion is that of rabies and red foxes. Regarding the control of this disease, Gier, 1948, said: "Control of rabies in wild animals must begin with positive control of rabies in dogs, by compulsory vaccination or quarantine, or both, in order to eliminate reinfection of wild animals. Beyond that, control measures must be a matter of prevention or elimination of overpopulations which lead to conditions favoring rabies and other diseases."

This disease can be controlled by vigorous and cooperative efforts on the part of the public. Here in Virginia widespread dog vaccination and stray-dog roundups have practically eliminated dogs from the rabies picture. Now the problem is a fox problem and the resulting losses in livestock and the mental anguish on human populations involved.

When rabies is prevalent in a wild population, the alternatives are to let the disease run its course, which may or may not result in a reduction in the infected population, or to reduce that population artificially and lessen the possibility of unhampered spread of the disease. The first choice can be a hard lesson, from the public health and economic standpoint, for there is some indication that the disease may linger in a wild population for years and will not reduce that population in an efficient-enough manner to stop the disease. So, we are left with the second alternative.

Most states reporting rabies in wild animals report large numbers of gray foxes and few red foxes involved in these outbreaks. This can be interpreted to indicate that, in any given area when fox rabies is a problem, the dominant species in that population is the one most importantly involved. Here in Virginia, with an overbalance of gray foxes, it is not at all surprising that the number of gray foxes being reported with rabies far outnumbered the number of red foxes being reported rabid, giving rise to the false idea that red foxes don't get rabies.

In our civilization there is no need for a disease, such as rabies, to run rampant through an area for any length of time, and the broad-minded individual can look with perspective at the long-range possibilities and bypass the pleasures of the moment.

It is hoped that as long as man is here on this earth, he will have the pleasure of seeing and the opportunity to hunt and otherwise utilize this animal that has adapted itself to our way of living.

has changed into a tiny spadefoot of nearly adult form. Usually, they then scatter widely before daybreak so that few if any can be found about the pool the next morning. In very dry weather, they sometimes hide under objects near the pool and scatter a few days later (seen twice) and take on the feeding and burrowing habits of the adults.

"It is unknown how long they need to reach breeding age. Savannah spadefoot juveniles grow rapidly if one may judge by a few which I have captured in the fall of the year. I suspect that a spadefoot does not breed before it is two years old, but I have never been able to tell this with certainty because of the difficulty in finding the animals once they have left the pool. Since Savannah spadefoots must grow more to reach adult size than forms like the western or plains spadefoot, whose tadpoles grow much larger before leaving the water, it may be that the latter take less time to reach adulthood. This and many other problems with the spadefoot toads are questions to be answered in the future."

Other Activities

During the remainder of the year spadefoots spend a great deal of time underground. With their spades they burrow in the soil. The digging motion is a shuffling of the hind legs resulting in backward progress. It is a curious sight to see a spadefoot disappearing rapidly backwards into the soil, watching you (so it seems) until its eyes disappear.

On warm humid nights, averaging about one night in ten, spadefoots sally forth from their burrows in search of food. Spring and fall are the seasons of greatest activity and, of course, winter is the time of hibernation. When spadefoots are out, they move about most just after dark and just before dawn. These rush hours are their best feeding times. Small animals on which they feed are most prevalent during the earliest and latest parts of the night.

Stomach analyses indicate that insects (preponderantly grasshoppers, beetles, and moths) compose over 50 percent of the spadefoot diet. Spiders, centipedes, millipedes, and snails, all of which are also favorite food items, compose most of the rest of their diet.

Home Range

Each individual spadefoot has a home range or territory over which it habitually travels in its usual activities and, within this territory, one to five burrows which it occupies at different times. In one region where spadefoots were studied intensively, the area of the home range of each adult averages about 100 square feet. Although one spadefoot was observed using the same burrow for 713 days, most individuals like to alternate burrows several times a year. When they emerge from their burrow to feed they usually forage within a radius of two or three feet of their hole.

Enemies

Because of the spadefoot's habit of hiding under-

ground during the day and of feeding under cover of darkness, danger from predators is not great. Rarer still is the instance of a biologist on hand to observe a nocturnal spadefoot tragedy. During the breeding period, predation is a more serious matter. Snakes, turtles, and many other animals take advantage of the feeding opportunity offered by a frog chorus, but only those with the toughest stomachs eat spadefoots or true toads. Gulls and other shore birds sometimes raid breeding choruses of spadefoots. Apparently, hognosed snakes are the only Virginia snakes that relish spadefoots. Occasional spadefoots are even removed from their burrows by hognoses and devoured.

Many hazards beset the eggs and tadpoles. Newts and leeches prey on the eggs. Numerous aquatic insects (dragonfly nymphs, waterscorpions, diving beetles, etc.) and other carnivorous animals destroy tadpoles. Although development is accelerated in drying ponds, many tadpoles lose the race and die when ponds go dry.

Existing Relatives of the Eastern Spadefoot

Four major kinds (species) of American spadefoots are recognized. Furthermore, in several of these, including our own species, there are geographic races (subspecies), swelling the total number of kinds known in the Western Hemisphere to eight. The Savannah spadefoot of eastern Texas and eastern Oklahoma (*Scaphiopus holbrooki hurteri*) and the Key West spadefoot (*Scaphiopus holbrooki albus*) interbreed with the eastern spadefoot in the regions where they meet it (and hence are subspecies of it). The Key West spadefoot is so similar to the eastern spadefoot (*Scaphiopus holbrooki holbrooki*) that a recent investigator has suggested that it does not deserve a technical name. The three other species of American spadefoots occur in the western United States and one of these ranges far south in Mexico. The western spadefoots are inhabitants of dry grasslands and deserts. They are able to survive the adverse conditions because of the exceptional ability in both adults and young to take advantage of the rains.

In Europe and southeastern Asia there are various representatives of the spadefoot stock. The three European spadefoots have the same kind of spade and in external appearance are very similar to the eastern spadefoot. However, the European species differ from the American species in anatomical details and so they are placed in their own genus, *Pelobates*. The Asiatic representatives are a motley crew, comprising eight genera, none of which has spades. The structure of the shoulder girdle, vertebrate, and leg muscles indicates their close relationship to the spadefoots. Some of them are much larger than spadefoots. In the Seychelle Island frog (*sooqlossus*), the female lays eggs on land, and after the eggs hatch the male carries the tadpoles about on his back. These Asiatic frogs without spades and the European and American spadefoots comprise the family *Scaphiopodidae*.

Evolutionary History

Because of the large numbers of kinds of spadefoots

in the southwestern United States and because a string of forms seems to lead from the Southwest and to culminate in the eastern spadefoot, certain biologists conclude that our spadefoot arose in the Southwest and through the ages gradually spread into adjacent regions. The idea that the desert country is their ancestral home seems well substantiated by their flash breeding behavior and rapid early development.

After considering the fossil spadefoots, Richard G. Zweifel has recently proposed another theory. In consideration of well known skeletons of extinct spadefoots from the United States, Europe, and especially one from Mongolia, he suggests that the spadefoot arose in deciduous forests of northern Asia and spread to Europe and North America. According to Zweifel's theory, the eastern spadefoot, the one most similar to the European spadefoot, is the most primitive of our spadefoots and certain of the southwestern spadefoots are the most specialized of the group. This theory seems reasonable except for the idea that spadefoots originated in deciduous forest. Too much of the structure and behavior of spadefoots suggests a dry environment. Their rapid response to rain, varied only by occasions when they are tricked by low atmospheric pressure without rain, was surely an adaptation to an arid climate from the very first. The eastern spadefoot, in preferring sandy or light soils, selects the driest situations available within its range. I am inclined to think that the original home of the spadefoots was in an arid region of Asia, that the weak representation of the spadefoots in Europe and the eastern United States indicates a marginal habitat in which the spadefoots survive but do not flourish, and that the success of the spadefoots in the southwestern United States is the result of a return to the type of environment in which spadefoots arose in Asia.

Literature

Most readers will be surprised to learn how much has been written about so inconsequential an animal as the spadefoot. A complete bibliography for the genus *Scaphiopus* would comprise several hundred papers, totaling over a thousand pages of printed matter. In the *Handbook of Frogs and Toads*, by Albert Hazen Wright and Anna Allen Wright, (Third Edition, Comstock Publishing Company, 1949), twenty-five pages are devoted to spadefoots and five pages to the eastern spadefoot alone. In *Amphibians of Western North America*, by Robert C. Stebbins, (University of California Press, 1951), twenty-five pages are devoted to four spadefoots. In the last several years a dozen articles have appeared on spadefoots. Just last year my good friend Pete Chrapliwy completed his Master's thesis on this topic (to be published soon in the University of Kansas science bulletin).

I hope there are some kindred spirits among the readers who will join me in applauding such investigations devoted to subjects without practical importance to man and far from the ruts of conventionality.

Work in Progress

Here at the College of William and Mary we are estab-

lishing a collection of preserved specimens and of data representing the reptiles and amphibians of Virginia. Because of the secretive habits and the brief appearance of eastern spadefoots in breeding choruses, the distribution of this species in Virginia is not well known. It is widespread in the Atlantic coastal plain, where it was first recorded in 1918, and occurs again in the Shenandoah Valley, at Bridgewater, and along the New River, at Radford. How widely distributed it is in the last areas and whether it occurs at all elsewhere are questions for the future. In Maryland, the eastern spadefoot has been found west of the coastal plain proper in local areas, called coastal recesses, where coastal plants occur. Perhaps a similar distributional pattern will be found in Virginia. Only through the assistance of alert naturalists in sending in specimens, alive or preserved, of this amphibian can such problems be quickly solved. And this is only one of the many kinds of amphibians and reptiles that occur in Virginia!

TAKE THEM WITH YOU (Continued from page 11)

rather a do-it-yourself affair with the kids gathering the wood and burning their own hot dogs in the embers. Such early cooperative expeditions (Junior and Susie help clean up afterwards, of course) might easily be the forerunner of more rugged camping trips for both of them. Camping trips on the crest of the Blue Ridge Mountains with boy scouts or girl scouts or, still further in the future, camping trips alone or with one or two chosen companions on an isolated island off the Eastern Shore. High adventure and enjoyment lies just over the horizon of the family picnic.

The lone hunter, a solitary figure silhouetted against the evening sky, is a familiar picture. So is the fisherman in the middle of the lake in his boat, alone with his thoughts and vast reaches of empty sky. Or the single bird watcher lying prone behind a clump of bushes. Such outdoor sports and hobbies can be conducted without a partner, which is both an advantage and a disadvantage. It is indisputable that there are times when all of us need to be alone. And certain people cannot function, in the present stepped-up tempo, if they don't give themselves periodic shots of solitude. But dashing off alone into the woods, like everything else, can be overcome.

Next time you stow all your gear into your car, instead of waving jauntily to your family on the doorstep, how about reconsidering and then maybe taking them along too? And, equally important, what about that kid who hangs around the pool room downtown? Maybe he's never caught a trout in his life and you have in your possession the ability to give him the thrill of his young life!

HELP PREVENT FOREST FIRES!

HUNTING AND FISHING (Continued from page 12)

willed Presque Isle to the U. S. Fish and Wildlife Service as a waterfowl refuge. It is a feeding place for ducks and geese and attracts birds in sizable numbers. This has been a great boon to the future of waterfowl and to hunter success up and down the James River.

Located near Chesterfield Courthouse, practically in the center of the county, is Pocahontas State Park, a large acreage owned by the state and used primarily for recreation. It has a lake which furnishes freshwater fishing to many, and the forest acts as a breeding area and refuge for upland game.

The Izaak Walton League of Richmond, an active conservation group, has recently established Walton Park near Midlothian. It is to have a lake for fishing, a skeet range and a place for boy and girl scouts to camp. Here youngsters will be taught the use of firearms, and various field trials will be run on this acreage. The park should be a boon to the youth of the area.

Above Richmond, the James River is one of the best smallmouth bass streams in Virginia; it also has bream, crappie and catfish in abundance. The James below Richmond is heavily polluted and the fish that come from this section are not edible. This, however, will be corrected as soon as Richmond completes its sewage treatment plant, probably by 1960. The shad and herring runs in spring afford food and pleasure to many enthusiastic fishermen near the mouths of Falling and Swift creeks. Numerous farm ponds stocked with bass and bream complete the fishing picture.

Chesterfield County, although developing rapidly, still offers hunting, fishing, and outdoor recreation for the people of the area. With a little planning and wise management, it should continue to do so for generations.

(Ed. Note: Commissioner Watkins' article appears as a chapter in a new informative booklet on Chesterfield County, published in connection with the Jamestown Festival. Edited by Bettie Weaver, the booklet is now on sale.

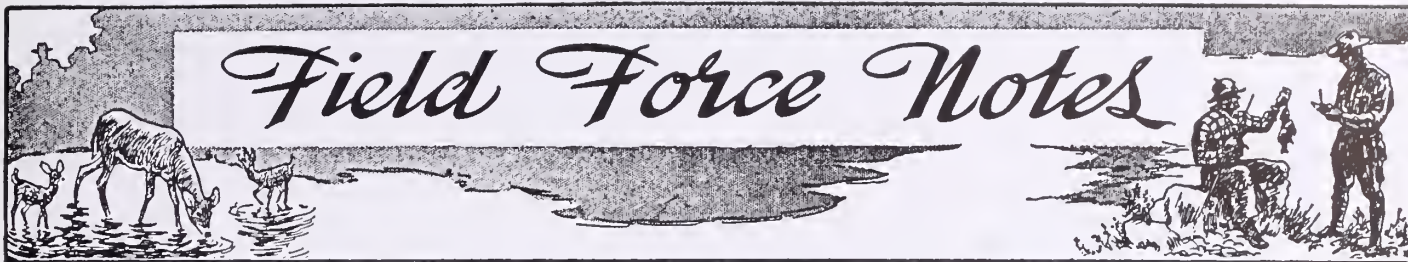
From time to time we will attempt to feature interesting sections of the state and would welcome contributions of this nature.)

Tonic for Tension

"The wilderness is a spiritual necessity, an antidote to the high pressure of modern life, a means of regaining serenity and equilibrium.

"I have found that people go to the wilderness for many things, but the most important of these is perspective. They may think they go for fishing or the scenery or companionship, but in reality it is something deeper. They go to the wilderness for the good of their souls."

SIGURD OLSON



Bear Stalks Along the Potomac

There is a 180-pound bear ranging in Virginia about twelve miles from Washington. James W. Engle, Jr., district game biologist, has a cabin on the Potomac at Eagle Rock just below Stubblefield Falls. Engle's father was looking over some timber and heard a noise on the ridge just above him. He looked up and saw the black bear working on some rotten logs on the hillside. Some of the people along the river had guessed that dogs were running a bear last winter. Now, according to Mr. Engle, there is no guess to it.

Coon Sings "Is I Blue?"

Game biologists are somewhat bewildered at the Commission of Game and Inland Fisheries by a report from York County of an identified blue raccoon. At first, the animal was thought to be a Maltese cat but on closer inspection he was proven to be a raccoon . . . but a blue 'coon! No medical check has yet been made on either the identifier for color blindness, or on the raccoon for a possible heart ailment.

Fishing Classes for 4-H Club

Max Carpenter, special services of-



Classes in the correct procedures used in fishing were greatly enjoyed by 4-H club members attending camp at Holliday Lake.

ficer of the Commission, is shown in the picture giving instructions in fishing to campers at Holliday Lake in Appomattox county.

The youngsters belong to the 4-H Club and for three days of classes were taught how to use a fly rod, spinning rod and how to bait cast. Carpenter gave prizes of fishing lines to the best students.

Recorded Wild Duck and Geese Calls to be Prohibited?

L. T. Quinn, executive director of the Game Commission, has stated that if the federal authorities do not prohibit the use of mechanical and electronic devices used in calling waterfowl, he is confident that the Virginia Commission will take steps to make it unlawful. According to Ross Leffler, Assistant Secretary of the Interior, extensive use of phonographs for hunting could threaten the preservation of the species. One case was reported of five hunters killing their bag-limits in an hour and a half, while using the recorded calls. In another instance recorded calls attracted Canada geese from a federal refuge to a blind 500 yards away. This happened on a windless, sunny day, generally considered to be poor hunting weather.

At the Atlantic Waterfowl Council Conference on May 23-24, 1957, Mr. Quinn introduced and secured the passage of the following resolution:

"Resolved that the Atlantic Waterfowl Council (composed of the directors of the game commissions of all the states in the Atlantic waterfowl flyway) requests that all types of electronic and similar mechanical devices used in calling waterfowl, including both ducks and geese, be prohibited."

The resolution was passed by a majority vote of fifteen to two.

Kesteloo Almost Broke the Record

It took 36 minutes for Leon Kes-



Leon Kesteloo, staff photographer for the Commission, displays a wide smile as he admires his "lunker" red drum.

teloo, staff photographer, to pull in this big channel bass while surf fishing off Eastern Shore. He caught the 55-pound red drum on a 12-pound test monofilament line using an 8-foot glass spinning rod. If he had been using a heavier line, twenty or thirty pound test line, he would have qualified for the world's record!

Commission Exhibits at State Fair

The Atlantic Rural Exposition, Inc. will again operate the State Fair of Virginia for nine days beginning September 20th and continuing through September 28th. The Commission of Game and Inland Fisheries will plan an exhibit for 500 square feet, as they have done in years past. It will be under the direction of the Education Division with the assistance of the special services officers. Game wardens, conservation officers and Education Division staff members will be at the exhibit booth to answer questions and explain the programs of the Commission to visitors.



Safety Award Made to Game Commission

For the second time since a safety program was inaugurated by executive



The Game Commission was presented a safety plaque for the second time, after turning in an accident record of 0.00 for the fiscal year of 1955-1956.

order of the Governor in 1950, the Commission of Game and Inland Fisheries has won the safety plaque. The first time was in 1952-1953 with an accident record of only 0.32, and again for the fiscal year ending June 30, 1956, with the enviable rating of 0.00, a perfect record. This means that in nearly 700,000 miles driven in state-owned cars last year, not a single accident was recorded against the Game Commission employees. The last presentation was made at the June 3 meeting and the award was given to Director I. T. Quinn, who received it for the Commission from Colonel Charles W. Woodson, Jr., Superintendent of State Police.

Conservation Schools Successful

The Virginia Resource-Use Education Council is sponsoring two conservation short courses this summer for teachers of the public schools of Vir-

ginia. The first one was in session at V.P.I. from June 12 through June 29. The other course in session at the College of William and Mary, began July 29 and terminates on August 16. Game and fish biologists of the Commission are assisting in teaching these courses, the purpose of which is to provide additional training for teachers in the subject of wise resource use.

Wood Duck Nest

Percy H. Martin, merchant farmer, lives six miles west of West Point at Sweet Hall. He has a large maple tree in his yard, three feet in diameter and about eighteen feet in height up to the fork. Where the limbs begin to fork, there is a hole three and a half feet deep in the trunk of the tree. For the third consecutive year, a wood duck has made her nest in this hole. It is a mile from any body of water, some distance from her natural habitat.

Virginia Salt Water Sport Fishing Association

On April 29, representatives from the Eastern Shore, Northern Neck, Rappahannock-York Peninsula, and the Norfolk-Virginia Beach area met to form the Salt Water Sport Fishing Association of Virginia.

The purposes of the Association are "... to promote salt water sport fishing in Virginia; to cooperate with public and private organizations and individuals in the enrichment and enjoyment of Virginia's salt water sport fishing resources and attractions; to advocate and support measures for the conservation of fish and wildlife, and to encourage and assist salt water sport fish and wildlife research and education."

The Commission of Game and Inland Fisheries believes this is a sound endeavor and the booklet distributed by the Department of Conservation and Development, entitled *Salt Water*

Sport Fishing in Virginia, is a free and enterprising boost towards the goal of the Association.

The officers of the newly formed group are as follows:

President—Melvin L. Shreves, Bloxom, Virginia

Vice-President — Winston Moutague, Richmond, Virginia

Secretary-Treasurer — Claude Rogers, Virginia Beach, Virginia

Acting Executive Secretary—Arthur W. James, Richmond, Virginia

Board of Directors:

James Mays, Norfolk, Virginia

Sidney Banks, Virginia Beach, Virginia

Dr. J. L. McHugh, Gloucester Point, Virginia

Jennings Culley, Richmond, Virginia

Dr. Warren Rains, Warsaw, Virginia

Herring Outwits Trout

During the last weekend in April the spring meeting of the Virginia Wildlife Federation was held in Covington. On Saturday, delegates and guests took time out from the business sessions for some angling in the Castile Hunt Club lake as guests of the club. Our own commissioner, "Uncle Tom" Herring, landed three rainbows in about an hour.



Photo Courtesy
The Virginian Newspaper, Covington
T. G. Herring, Commissioner, and his wife display trout taken in the Castile Hunt Club lake near Covington, Virginia.

Wildlife Questions and Answers

Ques.: How fast can our common crow fly?

Ans.: Under normal conditions our common crow flies around 30-35 miles per hour. However, if the occasion demands it, the crow can step up his speed to around 45 miles per hour.

Ques.: Have animals ever been trained to catch fish for humans?

Ans.: Yes. People in China and Japan have used a bird, the cormorant, for over 1,000 years in fishing. Another animal which has been trained to fish for man is the otter. Otter fishing was at one time rather common in scattered parts of the world, but it is now confined almost entirely to Asia.

Ques.: Are there any records available on the age that a turtle may reach in life?

Ans.: Dr. J. A. Oliver in his book, *The Natural History of North American Amphibians and Reptiles*, lists an eastern box turtle (*Terrapene c. carolina*) that is believed to be 138 years old. Although the age of this turtle is not substantiated by authentic records, many turtles have been found which are between 50 and 80 years of age. There is every indication that, by our standards, turtles live to a ripe old age.

Ques.: Does the term "minnow" refer to the size of a fish, particularly the smaller fish of a species?

Ans.: No. The word minnow refers to some members of the carp family which usually do not attain too great a size. For example, there is no such thing as a "trout minnow." Small trout would be called fingerlings or yearlings.

Ques.: How long can the otter stay submerged?

Ans.: This would probably depend upon the physical abilities of the individual animal. The average, however, for several animals would probably be around four minutes.

Ques.: Does the skunk ever make a noise that is characteristic of the species?

Ans.: The skunk is usually a silent animal but, upon occasion, may utter a low, scolding growl.

Ques.: Is plant life on the bottom of lakes and streams necessary for fish life?

Ans.: Definitely! Plants provide many useful services to fishlife. In the photosynthetic cycle, plants, during the daylight hours, add oxygen to the water which is very necessary to the welfare of the fish. Many species of fish use weed areas during the spawning season and weeds are very important in providing cover to escape enemies.



Ques.: When is the winter coat of the black bear usually shed?

Ans.: The winter coat of this species is usually shed during early summer and the growth of new hair isn't completed until fall.

Ques.: Is the bison capable of running very fast?

Ans.: Although the bison may attain weights of a half ton or more, he is capable of moving across the plains at speeds up to 40 miles per hour.

Ques.: Does a fish experience a great deal of pain when hooked?

Ans.: Authorities tell us that the nervous system of the fish is poorly developed. Since this is the case, the fish probably experiences discomfort rather than actual pain.

Ques.: Is it possible to determine the number of quail on an area by their "bobwhite" whistle?

Ans.: There is a census method known as the summer whistling cock count whereby the approximate number of quail on an area can be determined. Regular stops are made along roads in the area under study. The period between June 20 and July 10 seems to be the best time for these counts in the southeastern states. Nesting activities are at a high during this period. A certain time limit is devoted to each stop and all whistling (unmated) male bobwhites are recorded. From this number the approximate number of pairs or potential coveys can be determined. This will give some idea as to the population that can be expected during the fall hunting season.

Ques.: Many people have told me that the "dead man" section of the crab is poisonous. Would it be fatal if this section of a crab were eaten?

Ans.: The section of a crab referred to as the dead man is actually the gills of this animal. These gills are in no way poisonous and would not harm a person if they were eaten. They are commonly left in hard crabs and removed after the cooking process is completed. The gills are rather distasteful and spoil easily and for that reason are commonly removed.

Ques.: Do different soil types and locations influence the production of brackish-water fish ponds?

Ans.: Apparently the soil type and location of these ponds has some effect on their production of fish. Ponds having a volcanic or colloidal clay soil will produce more poundage of fish per acre than ponds having a calcareous clay or sandy soil bottom. The location of the pond also seems important in fish production. Largest yields come from ponds located approximately three quarters of a mile from the sea; but when the flow of fresh water is great, the yields of certain species will become less.

Ques.: There is a nest of baby wrens near my home and apparently the mother has been killed. I was wondering if you could tell me the type food to which these little creatures are accustomed?

Ans.: The main diet of the wren is insects. Stomach analyses of 88 individuals showed that 98 percent of the food was insects. The bulk of these insects were beetles, caterpillars and crickets.

EXAMPLES OF VIRGINIA'S BIRDS OF

PREY



BALD EAGLE (adult)



GOLDEN EAGLE (adult)



BROAD
WINGED
HAWK



RED-TAILED
HAWK



RED-SHOULDERED
HAWK



SPARROW
HAWK



OSPREY



DUCK
HAWK



MARSH
HAWK



PIGEON
HAWK



GOSHAWK



COOPERS
HAWK



SHARP-
SHINNED
HAWK